

**Patent Claims**

1. Pneumatically and/or electromotively actuatable disc brake for a utility vehicle, with
  - a) a caliper (1) that covers a disc brake (2),
  - b) at least one clamping device arranged in the caliper (1) for clamping the disc brake,
  - c) and at least one adjustment device arranged in the caliper (1) to offset brake lining wear, and/or brake disc wear by means of adjusting the distance between at least one brake lining (3, 4), and the brake disc (2), which consists of two axially displaceable adjustment elements (9, 10), each with a thrust piece (11, 12),  
**characterized in that**
    - d) the two adjustment elements (9, 10) of the at least one adjustment device (7, 8) are fixed torsion-resistantly in their areas that face the respective brake lining at a common connection plate (15, 16), and/or
    - e) at the connection plate (15, 16), and/or at the thrust piece (11) on the side facing the respective brake lining (3, 4), a single- or multi-part heat-insulating layer (13, 14) is attached at least section-wise.
2. Disc brake according to claim 1, **characterized in that** the connection plate (15, 16) is realized as a thermal shield, which is dimensioned in such a way that it largely covers the opening of an installation space in the caliper (1), in which the adjustment device (7, 8) is placed.
3. Disc brake according to one of the preceding claims, **characterized in that** the heat-insulating layer (13) is realized in one or several parts, and is directly attached to the connection plate (15, 16) as a plate.
4. Disc brake according to one of the preceding claims, **characterized in that** on each side of the disc brake (3) an adjustment device (7, 8) is positioned.

5. Disc brake according to one of the preceding claims, **characterized in that** the at least one adjustment device (7, 8) has at least one electric motor drive.
6. Disc brake according to one of the preceding claims, **characterized in that** a thrust piece plate (26) that forms the thrust piece (11) is positioned on the connection plate (15, 16) and bears the heat-insulating layer (13).
7. Disc brake according to one of the preceding claims, **characterized in that** the heat-insulating layer (13) is made of ceramic.
8. Disc brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) is held form flush axially and torsion-resistantly at the connection plate (15, 16).
9. Disc brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) has, toward the connection plate (15, 26), recesses (27) without contact in the material.
10. Disc brake according to one of the preceding claims, **characterized in that** the connection plate (15) is equipped with protuberances (28) in the connection area with the adjustment elements (9, 10) that face the brake lining (3, 4), in which the adjustment elements (9, 10) are fixed axially and torsion-resistantly.
11. Disc brake according to one of the preceding claims, **characterized in that** the cylinder-shaped protuberance (28) is equipped with stop notches (29) in its surface area, which inside the protuberance (28) are formed as catch grooves, and which on the outside correspond to catch grooves (30) of the thrust piece plate (26) and inside correspond to noses (31) of the adjustment element (9, 10).

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12. Disc brake according to one of the preceding claims, **characterized in that** the area of the adjustment element (9, 10) that is embedded in the protuberance (28) has on its surface side slots (32) that break through the material.
13. Disc brake according to one of the preceding claims, **characterized in that** the adjustment element (9, 10) has a peripheral collar (35) that rests against the connection plate (15).
14. Disc brake according to one of the preceding claims, **characterized in that** the collar (35) is equipped with breakthroughs (33).
15. Disc brake according to one of the preceding claims, **characterized in that** in the area of the part of the adjustment element (9, 10) that is embedded in the protuberance (28), which is adjacent to the collar (35), an undercutting (36) is formed, into which a correspondingly formed portion of the thrust piece plate (26) engages by pressing into the surface area of the protuberance (28).
16. Disc brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) is formed in a circular shape, whereby the portion of the wall of the center opening of the thrust piece plate (26) that engages in the undercutting (36) of the adjustment element (9, 10) is provided.
17. Disc brake according to one of the preceding claims, **characterized in that** an extension bellows (17, 18) is connected to the connection plate (15, 16) and covers the adjustment element (9, 10) at least partially.
18. Disc brake according to one of the preceding claims, **characterized in that** the extension bellows (17) is attached, at its end that faces the connection plate (15), to an inner collar (45) at the thrust element (9), and to an outer collar (46) at the connection plate (15).

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19. Disc brake according to one of the preceding claims, **characterized in that** the connection plate (15) is equipped in about its center area with a crimp folding (34) that extends in traverse to the longitudinal extension of the connection plate (15).
20. Disc brake according to the preamble of claim 1, or according to one of the preceding claims, **characterized in that** the thrust pieces (11, 12) and the lining supports (3b, 4b) are connected to one another in such a way that a retraction of the brake lining (3, 4) is guaranteed when the adjustment elements (9, 10) are turned back, and when the brake is released.
21. Disc brake according to claim 20, **characterized in that** at the thrust piece (11, 12), or at a component of the adjustment element (9, 10) connected with it, one or several plate springs (42) are arranged, which undercut a rod (43) in a recess (44) of the lining support (3b, 4b).
22. Disc brake according to claim 20, **characterized in that** at the lining support (3b, 4b) one or more plate springs are arranged, which undercut the thrust piece (11, 12) or a component of the adjustment element (9, 10) connected to it.

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**New Claims**

1. Pneumatically and/or electromotively actuatable disk brake for a utility vehicle, with
  - a) a caliper (1) that covers a disk brake (2),
  - b) at least one clamping device arranged in the caliper (1) for clamping the disk brake,
  - c) at least one adjustment device arranged in the caliper (1) for balancing out brake lining wear and/or brake disk wear by adjusting the distance between at least one brake lining (3, 4) and the brake disk (2), which consists of two axially moveable adjustment elements (9, 10), each with a thrust piece (11, 12),
  - d) wherein the two adjustment elements (9, 10) of the at least one adjustment device (7, 8) are torsion-resistantly fixed in their areas that face the respective brake linings at a common connection plate (15, 16),

**characterized in that**

  - e) at the connection plate (15, 16) and/or at the thrust piece (11) on the side that faces the respective brake lining (2, 4), a single-part or multi-part heat-insulating layer (13, 14) is attached at least section-wise,
  - f) and the connection plate (15, 16) is realized as a thermal shield, which is dimensioned in such a way that it largely covers the opening of an installation space in the caliper (1), in which the adjustment device (7, 8) is placed.
2. Disk brake according to one of the preceding claims, **characterized in that** the heat-insulating layer (13) is realized in one or more parts, and is directly attached to the connection plate (15, 16) as a plate.

3. Disk brake according to one of the preceding claims, **characterized in that** on each of the sides of the disk brake (3) an adjustment device (7, 8) is arranged.
4. Disk brake according to one of the preceding claims, **characterized in that** the at least one adjustment device (7, 8) has at least one electric motor drive.
5. Disk brake according to one of the preceding claims, **characterized in that** a thrust piece plate (26) that forms the thrust piece (11) is positioned on the connection plate (15, 16) and bears the heat-insulating layer (13).
6. Disk brake according to one of the preceding claims, **characterized in that** the heat-insulating layer (13) is made of ceramic.
7. Disk brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) is held form flush axially and torsion-resistantly at the connection plate (15, 16).
8. Disk brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) has, toward the connection plate (15, 26), recesses (27) without contact in the material.
9. Disk brake according to one of the preceding claims, **characterized in that** the connection plate (15) is equipped with protuberances (28) that face the brake lining (3, 4) in the connection area with the adjustment elements (9, 10), in which the adjustment elements (9, 10) are fixed axially and torsion-resistantly.
10. Disk brake according to one of the preceding claims, **characterized in that** the cylinder-shaped protuberance (28) is equipped with formed stop notches (29) in its surface area, which inside of the protuberance (28) are formed as catch grooves, and which on the outside correspond to catch grooves (30) of the thrust piece plate (26), and inside correspond to noses (31) of the adjustment element (9, 10).

11. Disk brake according to one of the preceding claims, **characterized in that** the area of the adjustment element (9, 10) that is embedded in the protuberance (28) has slots (32) that break through the material on the surface side.

12. Disk brake according to one of the preceding claims, **characterized in that** the adjustment element (9, 10) has a peripheral collar (35), which rests against the connection plate (15).

13. Disk brake according to one of the preceding claims, **characterized in that** the collar (35) is equipped with breakthroughs (33).

14. Disk brake according to one of the preceding claims, **characterized in that** in the area of the part of the adjustment element (9, 10) that is embedded in the protuberance (28), which is adjacent to the collar (35), an undercutting (36) is formed, into which a correspondingly formed porter of the thrust piece plate (26) engages by pressing into the surface area of the protuberance (28).

15. Disk brake according to one of the preceding claims, **characterized in that** the thrust piece plate (26) is formed in a circular shape, whereby the porter of the wall of the center opening of the thrust piece plate (26) that engages in the undercutting (36) of the adjustment element (9, 10) is provided.

16. Disk brake according to one of the preceding claims, **characterized in that** an extension bellows (17, 18) is connected to the connection plate (15, 16) and covers the adjustment element (9, 10) at least partially.

17. Disk brake according to one of the preceding claims, **characterized in that** the extension bellows (17), with its end that faces the connection plate (15), is attached to an inner collar (45) at the thrust element (9), and to an outer collar (46) at the connection plate (15).

18. Disk brake according to one of the preceding claims, **characterized in that** the connection plate (15) is equipped in about its center area with a crimp folding (34) that extends in traverse to the longitudinal extension of the connection plate (15).

19. Disk brake according to the preamble of claim 1, or according to one of the preceding claims, **characterized in that** the thrust pieces (11, 12) and the lining supports (3b, 4b) are connected to one another in such a way that a retraction of the brake lining (3, 4) is guaranteed when the adjustment elements (9, 10) are turned back, and when the brake is released.

20. Disk brake according to claim 20, **characterized in that** at the thrust piece (11, 12), or at a component of the adjustment element (9, 10) connected with it, one or several plate springs (42) are arranged, which undercut a rod (43) in a recess (44) of the lining support (3b, 4b).

21. Disk brake according to claim 20, **characterized in that** at the lining support (3b, 4b) one or more plate springs are arranged, which undercut the thrust piece (11, 12) or a component of the adjustment element (9, 10) connected to it.